

543

DART AEROSPACE LTD	Work Order:	24418
Description: Tow Ring	Part Number:	D2968-043
Dwg: D2968 Rev. B B1 05.10.06	Qty:	40
		Page 1 of 1

Step	Location	Procedure	By	Date	Qty
1	DC	Issue Traveler	AK	05/10/06	40
2	MC	Turn blank as per Folio FA048 and Dwg D2968 Material: AISI 4130 Ø 3/4 " Bar (M4130N-R0.750) Identify for D2968-3 Batch: M18767	AK	05/10/06	43
3	QC2	Inspect parts as they come off the CNC machine	AK	05/10/06	43
4	MC	Deburr, no sharp edges	AK	05/10/07	43
5	QC8	Second check	JL	05.10.17	43
6	MS	Turn blank as per Folio FA049 and Dwg D2968 Material: AISI 4130 3.00" OD x 2.00" ID tubing (M4130N-T3000W500) Batch: M18948	AK	05/11/04	45
7	QC2	Inspect parts as they come off the CNC machine	AK	05/11/06	45
8	MS	Deburr, no sharp edges	AK	05/11/06	45
9	QC8	Second check	JL	05/11/08	45
10	MV	Machine D2968-3 as per Folio FA048 and Dwg D2968 Identify as D2968-3	EP	05/10/10	43
11	QC2	Inspect parts as they come off the CNC machine	EP	05/10/10	43
12	MV	Deburr	EP	05/10/10	43
13	QC8	Second check	EP	05.10.18	40
14	MS	Weld D2968-3 & D2968-5 as per Dwg D2968 & QSI 004 using 4130 welding rod Identify as D2968-043 Batch: M15684	CPL	05.12.04	43
15	QC9/5	Inspect weld	AK	05/12/06	43
16	PG	Issue P/O: 242 Description: D2968-043 to heat treat to ultimate tensile strength 125ksi as per Dwg D2968 Conformity sheet required	h	05.12.07	43
17	PG	Issue P/O: 243 Cad Plate per QQ-P-416F Class I Type II Conformity sheet required	h	05.12.07	43
18	RG	Receive and inspect for transit damage Ensure conformity sheets are attached	h	06/01/05	43
19	QC3	Inspect Cad Plate	h	06/01/09	43
20	FP	Powder Coat Gloss White (Ref: 4.3.5.2) as per QSI 005 4.3 ***DO NOT POWDER COAT THREADS***	h	06/01/10	43
21	QC3	Inspect Powder Coat	h	06/01/11	44
22	ST	Identify and Stock Loc 128	h	06/01/11	44
23	AC	Cost / part	Sat	06-01-12	44
24	DC	Close W/O Inspect Level 21	h	06/01/16	44

Rev	Date	Change	Revised By	Approved
A	00.04.25	New issue	EC	
B	02.04.10	Added inspect level 21	NG	
C	03.04.11	Reformat; Incorporated D2968-3/-5	KJ/RF	RF

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☐ No ☒ DQA: ☒ Date: 06/11/16

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

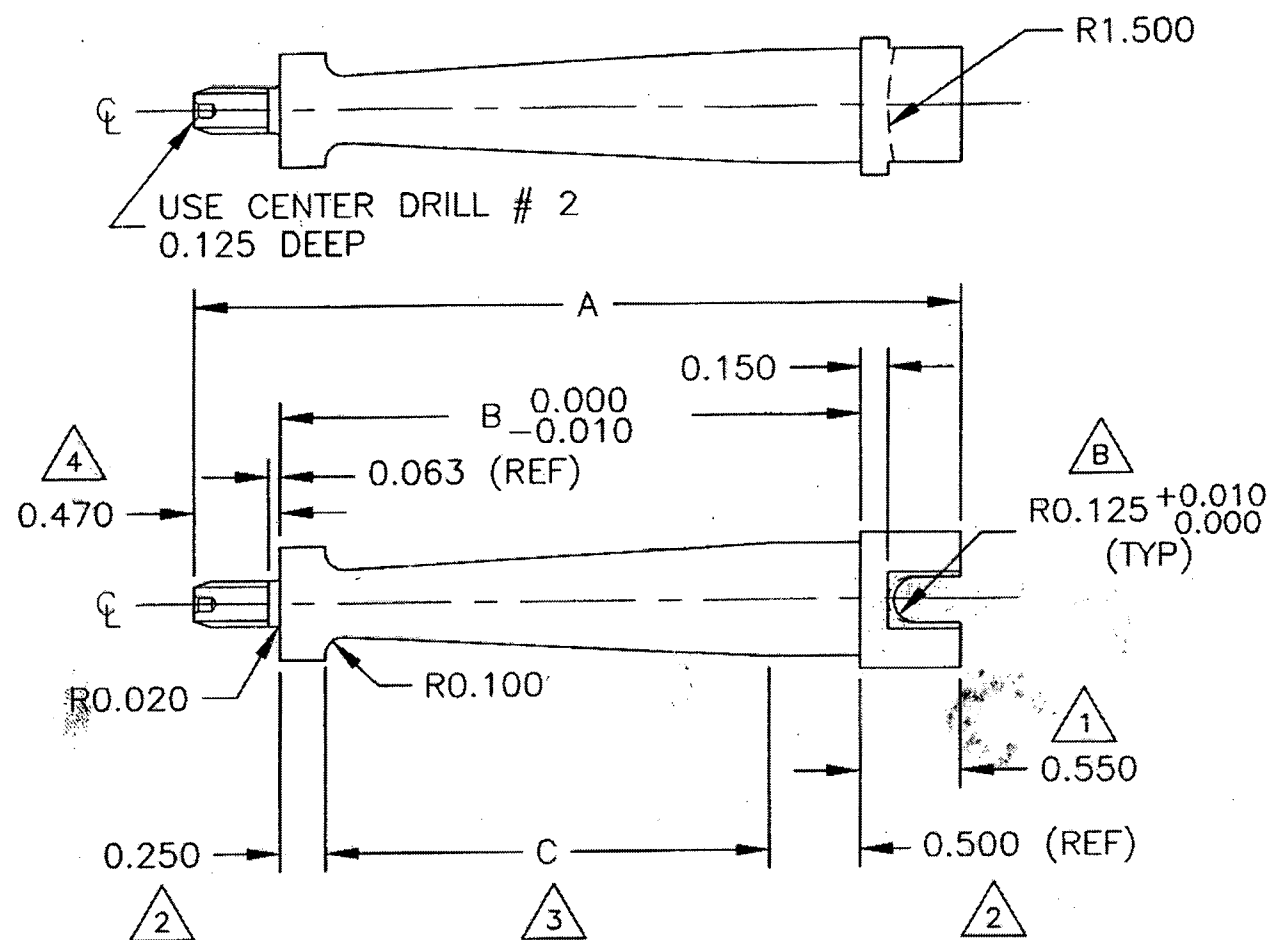
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____



PART NUMBER	A	B	C
D2968-1	5.040	4.020	3.270
D2968-3	4.200	3.180	2.430

D2968-1/-3 STEM

D2968-1 AND D2968-3 STEM:

MATERIAL: AISI 4130

1 ϕ 0.750 O.D.

2 ϕ 0.625 O.D.

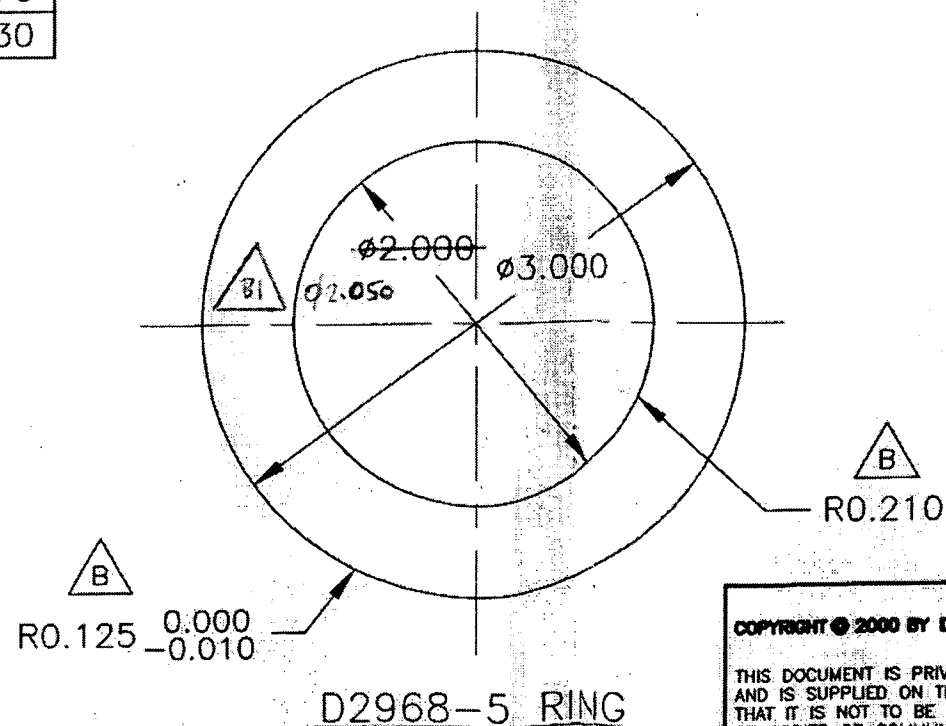
3 MACHINE UNIFORM TAPER FROM ϕ 0.363 O.D. TO ϕ 0.625 O.D.

4 1/4-28 UNF THREAD WITH 0.063 GRIP MACHINE ALL INSIDE EDGES WITH A 0.010 RADIUS UNLESS OTHERWISE INDICATED TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

D2968-5 RING:

MATERIAL AISI 4130

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED



ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMEND
WITHOUT NOTICE

WORK ORDER

NO. 24418

RELEASED
00-06-09

UNDER REVIEW

USE 2968-1 STEM
FOR -041

USE 2968-3 STEM
FOR -043

D2968-5 RING

1/8

D2968-041 AND D2968-043 TOW RING:

WELD PER QSI 004 ON ALL EDGES BETWEEN STEM AND RING
HEAT TREAT TO MIN ULTIMATE TENSILE STRENGTH OF 125 KSI

FINISH: CAD PLATE ENTIRE ASSEMBLY PER

QQ-P-416F CLASS I TYPE II

POWDER COAT WHITE (REF 4.3.5.2) PER DART

QSI 005 4.3 (EXCEPT THREADS)

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

B	00.05.31	R0.125 AND R0.210 WERE 0.060 x 45°
A	00.03.07	NEW ISSUE
DESIGN	DRAWN BY	DART DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO. D2968 REV. B
DATE	00.05.31	TOW RING SHEET 1 OF 1
		SCALE 1:1

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81 04 02 06 2.050 WTS 2.000

Job Costing Report

Dart Aerospace Ltd.
Hawkesbury

Oct 05, 2005
10:49 am

Work Order No : 0024418
Project Name : D2968-043
Project For : WK543
Work Order Type : Main
Main WO Number :
House Part Number : D2968-043
Description : Tow Ring
Manufactured : Yes
Amount Req'd : 40
Amount Done : 0
Start Date : 10-04-05
Est Finish Date : 10-20-05
Act Finish Date :
Drawings Req'd : No
Ok for Approval :
Approval Rec'd :

Department Code:
Burden Flags : NNNNNNNN
WO Status : Open
Invoice State : Not Invoiced
Invoice Date :
Invoice Number :
Invoice Amount : 0.00
Order Entry No :
OE Value : 0.00
Est Mark Up : 0.000%
Actual Mark Up : 0.000%
\$0 Posted to Finished Goods

	Estimated	Actual	Var. %	Posted	To Post
Material Cost :	0.00	0.00	0.00	0.00	0.00
Engineering Hours :	0.00	0.00	0.00		
Engineering Cost :	0.00	0.00	0.00	0.00	0.00
Production Hours :	0.00	0.00	0.00		
Production Cost :	0.00	0.00	0.00	0.00	0.00
Packaging Hours :	0.00	0.00	0.00		
Packaging Cost :	0.00	0.00	0.00	0.00	0.00
OverHead Hours :	0.00	0.00	0.00		
OverHead Cost :	0.00	0.00	0.00	0.00	0.00
CNC Hours :	0.00	0.00	0.00		
CNC :	0.00	0.00	0.00	0.00	0.00
Misc. Hours :	0.00	0.00	0.00		
Misc. :	0.00	0.00	0.00	0.00	0.00
Burden :	0.00	0.00	0.00		
Total Cost :	0.00	0.00	0.00		
Mark up :	0.000	0.000			
Selling Cost :	0.00	0.00			

	Estimated	Actual
Labour Hrs/Amount Done :	0.00	0.00
Profits/(Loss) :	0.00	0.00

DART AEROSPACE LTD		Work Order:	24418
Description: RING		Part Number:	D2968-5
Inspection Dwg: D2968 Rev: B1		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

[illegible]

Measured by: <i>JML</i>	Audited by: <i>J.L</i>	Prototype Approval: <i>N/A</i>
Date: <i>05/11/04</i>	Date: <i>05-11-04</i>	Date: <i>N/A</i>

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/RF	

Job Costing Report

Dart Aerospace Ltd.
Hawkesbury

Nov 08, 2005
12:08 pm

Work Order No : 0024418
Project Name : D2968-043
Project For : WK543
Work Order Type : Main
Main WO Number :
House Part Number : D2968-043
Description : Tow Ring
Manufactured : Yes
Amount Req'd : 40
Amount Done : 0
Start Date : 10-04-05
Est Finish Date : 10-20-05
Act Finish Date :
Drawings Req'd : No
Ok for Approval :
Approval Rec'd :

Department Code:
Burden Flags : NNNNNNNN
WO Status : Open
Invoice State : Not Invoiced
Invoice Date :
Invoice Number :
Invoice Amount : 0.00
Order Entry No :
OE Value : 0.00
Est Margin : 0.000%
Actual Margin : 0.000%
\$0 Posted to Finished Goods

	Estimated	Actual	Var. %	Posted	To Post
Material Cost :	0.00	0.00	0.00	0.00	0.00
Engineering Hours :	0.00	0.00	0.00		
Engineering Cost :	0.00	0.00	0.00	0.00	0.00
Production Hours :	0.00	21.00	100.00		
Production Cost :	0.00	397.32	100.00	0.00	397.32
Packaging Hours :	0.00	0.00	0.00		
Packaging Cost :	0.00	0.00	0.00	0.00	0.00
OverHead Hours :	0.00	0.00	0.00		
OverHead Cost :	0.00	0.00	0.00	0.00	0.00
CNC Hours :	0.00	23.75	100.00		
CNC :	0.00	0.00	0.00	0.00	0.00
Misc. Hours :	0.00	0.00	0.00		
Misc. :	0.00	0.00	0.00	0.00	0.00
Burden :	0.00	0.00	0.00		
Total Cost :	0.00	397.32	100.00		
Margin :	0.000	0.000			
Selling Cost :	0.00	397.32			

	Estimated	Actual
Labour Hrs/Amount Done :	0.00	0.00
Profits/(Loss) :	0.00	(-397.32)

MIS 01B
u
11.13

Date: Monday, 14/11/2005 8:24:48 AM
 User: Alba Panzuto











Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: TOW RING
Job Number	: 24418		
Estimate Number	: 10400		
P.O. Number	:	Part Number	: D2968043
This Issue	: 14/11/2005	S.O. No.	:
Prsht Rev.	: NC	Drawing Number	: D2968 UNDER REVIEW
First Issue	: / /	Project Number	:
Previous Run	:	Drawing Revision	: B1
	Type : MACHINED PARTS	Material	:
Written By	:	Due Date	: 30/11/2005
Checked & Approved By	:	Qty:	40
Comment	: Est:C 03.04.11 Reformat; Incorporated D2968-1/-5 KJ/RF	Um:	Each

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	24418A	STEM
		
Comment: Sub-Component STEM		
2.0	24418B	RING
		
Comment: Sub-Component RING		
3.0	D29683	Stem
4.0	D29685	Ring
5.0	LARGE FAB 1	LARGE FABRICATION RESOURCE 1
		
Comment: LARGE FABRICATION RESOURCE 1 Weld D2968-3 & D2968-5 as per Dwg D2968 & QSI 004 using 4130 welding rod Identify as D2968-043 Batch: _____		
6.0	QC5/9	WELD INSPECTION
		
Comment: WELD INSPECTION		
7.0	PG	PURCHASING
		
Comment: PURCHASING Issue P/O: _____ Description: D2968-043 to heat treat to ultimate tensile strength 125ksi as per Dwg D2968 Conformity sheet required Issue P/O: _____ Cad Plate per QQ-P-416F Class I Type II		

Date: Monday, 14/11/2005 8:24:48 AM
User: Alba Panzuto

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: TOW RING

Job Number: 24418

Part Number: D2968043

Job Number:



Seq. #:

Machine Or Operation:

Description :

Conformity sheet required

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

9.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT CAD PLATE

10.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.2) as per QSI 005 4.3

DO NOT POWDER COAT THREADS

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT

12.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

13.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

Job Completion



Date: Monday, 14/11/2005 8:24:50 AM
 User: Alba Panzuto

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	STEM
Job Number :	24418A		
Estimate Number :	10399		
P.O. Number :		Part Number :	D29683
This Issue :	14/11/2005	S.O. No. :	
Prsht Rev. :	NC	Drawing Number :	D2968 UNDER REVIEW
First Issue :	/ /	Project Number :	
Previous Run :		Drawing Revision :	B1
	Type :	Material :	
	MACHINED PARTS	Due Date :	30/11/2005
Written By :		Qty:	40
Checked & Approved By :		Um:	Each
Comment :	Est:C 03.04.11 Reformat; Incorporated D2968-1/-5 KJ/RF		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

1.0	M4130NR0750	4130 steel rod .750"
-----	-------------	----------------------

2.0	HARDINGE	HARDINGE CNC LATHE SMALL
-----	----------	--------------------------



Comment: HARDINGE CNC LATHE SMALL

1-Turn Blank as per Folio FA048 and Dwg D2968

2-Deburr, no sharp edges

3.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
-----	-----	--



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

4.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
-----	-------	--------------------------------



Comment: HAAS CNC VERTICAL MACHINING #1

1- Machine as per Folio FA048 and Dwg D2968

2- Deburr

5.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
-----	-----	--



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

6.0	QC8	SECOND CHECK
-----	-----	--------------



Comment: SECOND CHECK

7.0	PACKAGING 1	PACKAGING RESOURCE #1
-----	-------------	-----------------------



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

Date: Monday, 14/11/2005 8:24:51 AM
User: Alba Panzuto

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: RING
Job Number	: 24418B		
Estimate Number	: 10395		
P.O. Number	:	Part Number	: D29685
This Issue	: 14/11/2005 S.O. No. :	Drawing Number	: D2968 UNDER REVIEW
Prsht Rev.	: NC	Project Number	:
First Issue	: / / Type : MACHINED PARTS	Drawing Revision	: B1
Previous Run	: 23761B	Material	:
Written By	:	Due Date	: 30/11/2005 Qty: 40 Um: Each
Checked & Approved By	:		
Comment	: Est:C 03.04.11 Reformat; Incorporated D2968-1/-5 KJ/RF		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	M4130NT3000W500	4130 Tube 3"ODx.5"W
2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
Comment: MORI SEIKI LATHE 1-Turn Blank as per Folio FA049 and Dwg D2968 2-Deburr, no sharp edges		
3.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
Comment: INSPECT PARTS AS THEY COME OFF MACHINE		
4.0	QC8	SECOND CHECK
Comment: SECOND CHECK		
5.0	PACKAGING 1	PACKAGING RESOURCE #1
Comment: PACKAGING RESOURCE #1 Identify and Stock Location: _____		
6.0	DC	DOCUMENT CONTROL
Comment: DOCUMENT CONTROL Inspection Level 21		

Job Completion



Date: Monday, 14/11/2005 8:24:50 AM
User: Alba Panzuto

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: STEM

Job Number: 24418A

Part Number: D29683

Job Number:



Seq. #:

Machine Or Operation:

Description :

8.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

Job Completion



MANCO
DOMPLEX

8895 Crescent 3
Anjou (Québec) H1J 1B6
Tél.: (514) 355-7867
Fax: (514) 355-8750

CERTIFICAT DE CONFORMITÉ
CERTIFICATE OF COMPLIANCE

6060

DART Aerospace LTD
Client / Customer

1 Lot of pieces
de la pièce / part

P00000243
Votre # de commande / Your purchase order #

97726
Notre # de bon de livraison / Our packing slip #

Inspecteur / Inspector <u>Renault</u>	Date, équipe / Date, shift <u>Dec 31, 2005</u>
Placage / Plating <u>QQP-416F CLASS I TYPE II</u>	
Quantité totale / Total quantity <u>1 Lot</u>	Quantité inspectée / Inspected quantity <u>1 Lot</u>
Adhésion / Adhesion <u>good</u>	
Épaisseur / Thickness L.C.D.	H.C.D. Moy. / aver. <u>0.0005</u>
Coulisses, taches / Leach, spots <u>NO</u>	Rugosité / Roughness <u>NO</u>
Quantité approuvée / Approved quantity <u>1 Lot</u>	Quantité rejetée / Rejected quantity <u>NO</u>

Commentaires / Comments

D2968-041-B24537 = 41 Pcs
D2968-043-B24410 = 43 Pcs

Nous certifions que les pièces énumérées ci-dessus ont été faites en conformité avec vos dessins et spécifications et rencontrent les exigences contenues dans ces dessins et/ou spécifications.

We hereby certify that the parts listed above have been made in accordance with your drawings and specifications and are correct to the requirements contained in those drawings and/or specifications.

Signé au nom de
Signed on behalf of

MANCO
DOMPLEX



RELEASE NOTE

GST No.: R105468102

OAK 70940-1

☒ HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489

☐ 2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380

☐ QUEBEC DIVISION
7450 RUE VEROTÉ STREET, ST. LAURENT, QUEBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

12/20/2005

MM / DD / YYYY

PAGE: 1

1DAR01
BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: MANCO DOMPLES
4660 HICKMORE
ST. LAURENT, QUEBEC

K6A 1K7

H4T 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
12/20/2005		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO00000242		COD

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHIPD	TEST RESULTS
----------	-------------	-----	------------	--------------	--------------

D2968-041 D2968-043 EA 84 84
TOW RING

Process Specifications: Procedure: 4047
HEAT TREATED AS PER DRAWING TO 125 KSI MIN.
HRC 27-32.5
MATERIAL: 4130

41 PCS, D2968-041, B24537
43 PCS, D2968-043, B24410

100% HARDNESS TESTED

29/30 HRC

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Authorized O.C. Inspector



VACUUM BRAZING - HEAT TREATING - SPECIAL PROCESSING - FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL - PLASMA AND OTHER COATINGS

VAC AERO THERMAL

905-825-8303

10:10



HEAT TREATING

PAGE 02/02

01/06/2006